

AMENDMENTS TO THE SPECIFICATION:

Please cancel the originally-filed Abstract of the Disclosure, and add the accompanying new Abstract of the Disclosure which appears on a separate sheet in the Appendix.

Please delete the paragraph beginning on page 3, line 1, and add the following new paragraph:

-- For this reason, and according to the invention, a bicycle pedal is proposed comprising a pedal body constituted of a globally rectangular horizontal plate fitted on its upper surface with means for locking a cyclist's shoe and on one of its longitudinal edges a case containing a pedal pin designed to be fixed to the free end of a crank remarkable in that the plate is secured to the case so that its upper surface extends beneath the pedal pin along a distance a and the support axis of the shoe on the pedal plate which merges with the front plate passing through the metatarsus of the cyclist's big toe when the latter is pedalling, extends in front of the pedal pin along a distance b so that the pedal support axis describes a circular curve with centre  $O'$  and radius  $r'$  offset from a downwards and from b forward relative to the circular curve of the pedal pin with centre  $O$ , where  $O'$  is the axis of the cycle bottom bracket shell and of radius  $r$  and in that the means for locking comprise, on one hand, a front interlocking mechanism designed to co-operate with the front part of a clip integral with the sole of the cyclist's shoe and, on the other hand, a movable rear interlocking mechanism designed to co-operate with the rear part of the clip of the shoe, the movable rear interlocking mechanism being movable under the pressure of the rear part of the clip of the shoe from a position called interlocked, and passing through an open position allowing to insert or remove the rear part of the

clip of the shoe, until returning to the interlocking position under stress from an elastic means.--

Please delete the paragraphs beginning on page 6, line 7 and ending on page 8, line 15 and add the following new paragraphs.

-- We note that the curve C corresponds to the travel of a pedal of the prior art, that being a pedal whose upper surface of the plate, and the support axis 7 of the shoe on said pedal plate 2 merge with the pedal pin 4 attached to the far free end of the crank. Furthermore, we note that in the vicinity of the top dead centre, that being in the vicinity of the upper end of the curve C', the support axis 7 of the shoe on the pedal plate 2 is forward in relation to the support axis of the shoe of a pedal of the prior art, which produces a faster passage of the top dead centre. Moreover, in the anterior upper quadrant and on the largest part of the anterior lower quadrant of the curve C', the support axis 7 of the shoe on the pedal plate 2 is located in front of the position of the support axis of the shoe on the plate of a pedal of the prior art thus creating a lever arm bigger than the pedals of the prior art which facilitates the pedalling action, of the cyclist by producing greater stress for a same applied force on the pedal. Finally, between the bottom dead centre, that being the passage point of the support axis of the shoe on the pedal plate 2 at the lower end of the curve C', and as far as the top dead centre, the support axis 7 of the shoe on the pedal plate 2 is also located forward of the support axis of the pedal of the prior art which does not alter the pedal efficiency according to the invention as between the bottom dead centre and the top dead centre the cyclist applies practically no pressure on the pedal.

In reference to figure 1, 3, 4 and 5, the bicycle pedal according to the invention comprises on the upper surface of

the plate 2 front 5 and rear 6 means for locking a cyclist's shoe 8 (figures 3 to 5). The means for locking 5 and 6 of a shoe 8 comprise, on one hand, a front interlocking mechanism 5 designed to co-operate with the front part of a clip 9 integral with the sole 10 of the cyclist's shoe 8 and, on the other hand, a movable rear interlocking mechanism 6 designed to co-operate with the rear part of the clip 9 of the shoe 8, the movable rear interlocking mechanism 6 being movable under the pressure of the rear part of the clip 9 of the shoe 8 from a position called interlocked, and passing through an open position allowing to insert or remove the rear part of the clip 9 of the shoe 8, until returning to the interlocking position under stress from an elastic means which will be described later on.

The front interlocking mechanism 5 consist in a recess 11 made in the upper surface of the plate 2, in its front part, and in which a clamp 12 is located which slightly juts out from the upper surface of the plate 2 which is designed to receive means for fitting a lug 13 jutting out from the front part of the clip 9 of the cyclist's shoe 8. This clamp 12 consist, for example, in a U-shaped metal part whose legs are attached to the inner walls of the recess 11 made in the upper surface of the plate 2 so that the base of the U extends globally parallel to the upper surface of the plate 2 by slightly jutting out from the latter.

Furthermore, the movable rear interlocking element 6 consists in a second clamp 14 articulated about a transversal pin 15 extending from the rear of the plate 2, said transversal pin 15 extending parallel to the axis 4 of the pedal case 3, and from the lower end of which leans a spherical mounting 16 located at the free end of a rod 17 extending longitudinally beneath the transversal hinge pin 15 of the clamp 14. This rod 17 is integral with a piston 18 sliding within a longitudinal recess 19 made in the plate 2

and opening out onto the rear end of said plate 2, said piston 18 leaning against a coil spring 20 located in said longitudinal recess 19. The rod 17 preferably consists of a threaded rod co-operating with a thread 21 made in the piston 18 sliding along the longitudinal recess 19. Moreover, the free end of the swivel mounting 16 comprises a screw head 22 extending across an opening 23 made in the lower end of the clamp 14 and opening out onto its rear surface, the swivel mounting 16 leaning against a concave hollow 24 whose radius of curvature is identical to that of the swivel mounting 16.--

Please delete the paragraphs beginning on page 8, line 19 and ending on page 10, line 33 and add the following new paragraphs.

--The lug 13 jutting out from the front part of the clip 9 of the shoe 8 is inserted into the recess 11 until said lug 13 is embedded beneath the front clamp 12 (figure 3). The cyclist then presses down on his heel until the rear part of the clip 9 of the shoe 8, advantageously bevelled, leans against the second clamp 14 of the rear interlocking mechanism 6 rotating the latter about its axis 15. We note that when the second clamp 14 is rotating, the swivel mounting 16 drives the rod 17 and the piston 18 in a straight line into the longitudinal recess 19 by compressing the coil spring 20 (figure 4). By continuing to press his heel down, the clip 9 then leans against the upper surface of the pedal plate 2, the rear end of the clip 9 then extending beneath the clamp 14 of the rear interlocking mechanism 6 which has returned to its initial position known as interlocking under pressure from the coil spring 20 which moved the piston 18 and the rod 17 at the free end of which the swivel mounting 16 is merged in order to rotate the second clamp 14 until it reaches its initial interlocking position. Traditionally, the retracting of the clip 9 between the front interlocking mechanism 5 and the rear interlocking mechanism 6 is performed by supinating the ankle

allowing to release the rear part of the clip 9 from the rear interlocking mechanism 6.

According to a first alternative embodiment of the bicycle pedal according to the invention, in reference to figure 6, said plate 2 comprises a movable plate 25 on its upper surface designed to slide longitudinally and on the upper surface of which merge the front 5 and rear 6 means for locking a cyclist's shoe, such as described above, in order to adapt the longitudinal position of said front 5 and rear 6 means for locking of the shoe according to the shoe size of the cyclist or even to adjust the distance b separating the pedal pin 4 from the support axis 7 of the shoe on the pedal plate 2. The upper surface of the plate 2 comprises a U-shaped longitudinal groove 26 of transversal section in which a U-shaped longitudinal guide 27 of transversal section slides beneath the movable plate 25 comprising the front 5 and rear 6 locking mechanisms. The plate 2 further comprises four longitudinal oblong openings 28 located on either side of the longitudinal groove 26 and crossed by bolts 29 designed to cooperate with the corresponding threaded holes made in the lower surface of the movable plate 25.

Of course the plate 2 can comprise but two longitudinal oblong openings 28 whilst remaining within the scope of the invention.

According to a second alternative embodiment of the bicycle pedal according to the invention, in reference to figures 7 and 8, the plate 2 comprises, as does the above, a movable plate 25 on its upper surface designed to slide longitudinally and on the upper surface of which merge the means for locking a cyclist's shoe. The upper surface of the plate comprises a longitudinal hollow 30 opening out onto its front end and in which the movable plate 25 slides so that the upper surface of said plate 25 is flush with the upper surface of the plate 2. The longitudinal edges of the movable plate 25

comprise the toothed elements 31 designed to co-operate with the complementary toothed elements 32 integral with the longitudinal edges of the hollow 30 of the plate 2 in order to ensure the locking of the plate 25 in said hollow 30. The means for locking the cyclist's shoe are constituted in a toe clip 33 integral with the front end of the movable plate 25. Furthermore, in order to attain the longitudinal position of the means for locking the shoe, that being of the movable plate 25, according to the shoe size of the cyclist, the upper surface of the plate 2 advantageously comprises an indicator 34 designed to coincide with the digital references 35, indicating the shoe size of the cyclist, located on the upper surface of the movable pedal plate 25.

According to another alternative embodiment of the pedal according to the invention, in reference to figures 9 and 10, the front interlocking mechanism 5 of the pedal can consists in a stud 37 extending vertically from the upper surface of the plate 2, in its front part, and comprising retention means at its upper end created by a flange 38, said stud 37 lodging into a recess 39 made in a lug 13 which juts out from the front part of the clip 9 of the cyclist's shoe 8 and which is V shaped at the bottom of which a globally semicircular complementary recess 40 is made whose diameter is slightly bigger than the diameter of the stud 37.--

Please delete the paragraph beginning on page 11 line 10 and ending on page 11, line 23 and add the following new paragraph.

--According to another embodiment of the pedal according to the invention, in reference to figures 12 and 13, the pedal/crank unit 41 comprises a belt 43 extending along the crank 41 between a drive pinion 44 integral with the cycle bottom bracket shell and a driven pinion 45 integral with the case 3 of the pedal so that the rotational movement of the crank 41 rotates the pedal plate 2 at pedal pin height. The

driven pinion 45 is integral with the case 3 of the pedal by means of a coil spring 46 located on the inside of a circular recess 47 made in the driven pinion 45 so that the axis of the spring extends in a coaxial manner to the axis of rotation of the driven pinion 45, the ends of the coil spring 46 being respectively integral with the driven pinion 45 and the case 3 of the pedal.--

Please delete the paragraphs beginning on page 11, line 30 and ending on page 12, line 29 and add the following new paragraphs.

--Finally, according to a last alternative embodiment of the pedal according to the invention, in reference to figures 14 to 16, the latter comprises a movable plate 25 designed to slide longitudinally along the upper surface of the pedal plate 2, the movable plate 25 being fitted with front 5 and rear 6 means for locking a cyclist's shoe. The pedal further comprises a connecting rod 49 of which a first end is freely mounted in rotation about an eccentric 50 of a case 51 integral with the free end of the crank 41 and whose second end comprises a transversal pin 52 about which the front end of the movable pedal plate 25 is freely mounted in rotation, the rear part of the pedal plate 2 being freely mounted in rotation about the axis of the free end of the crank 41 on a ball bearing 53.

Such a configuration allows to vary the distance b separating the pedal pin from the support axis 7 of the shoe on said pedal throughout the entire circular revolution of the pedal during the action of pedalling. Thus, in reference to figure 16, during an anticlockwise revolution of the pedal, as indicated by the arrow g, the pedal plate 2 remains globally horizontal during the revolution of the pedal and the distance b separating the pedal pin from the support axis 7 of the shoe on said pedal increases in the anterior and posterior upper quadrants, that being between the positions where the crank 41

is located globally horizontally forwards and backwards, then decreases in the anterior and posterior lower quadrants. We note that the distance b separating the pedal pin from the support axis 7 of the shoe on said pedal is maximal when the pedal is located in its globally horizontal forward position, that being when the pressure applied by the cyclist's foot is also maximal thus providing greater torque during pedalling in relation to pedals of the prior art.--